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LICEAGA, Eduardo

Essay upon the Peñon waters
and baths. City of Mexico,
1892.

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ESSAY
UPON THE
PEÑON WATERS AND BATHS.

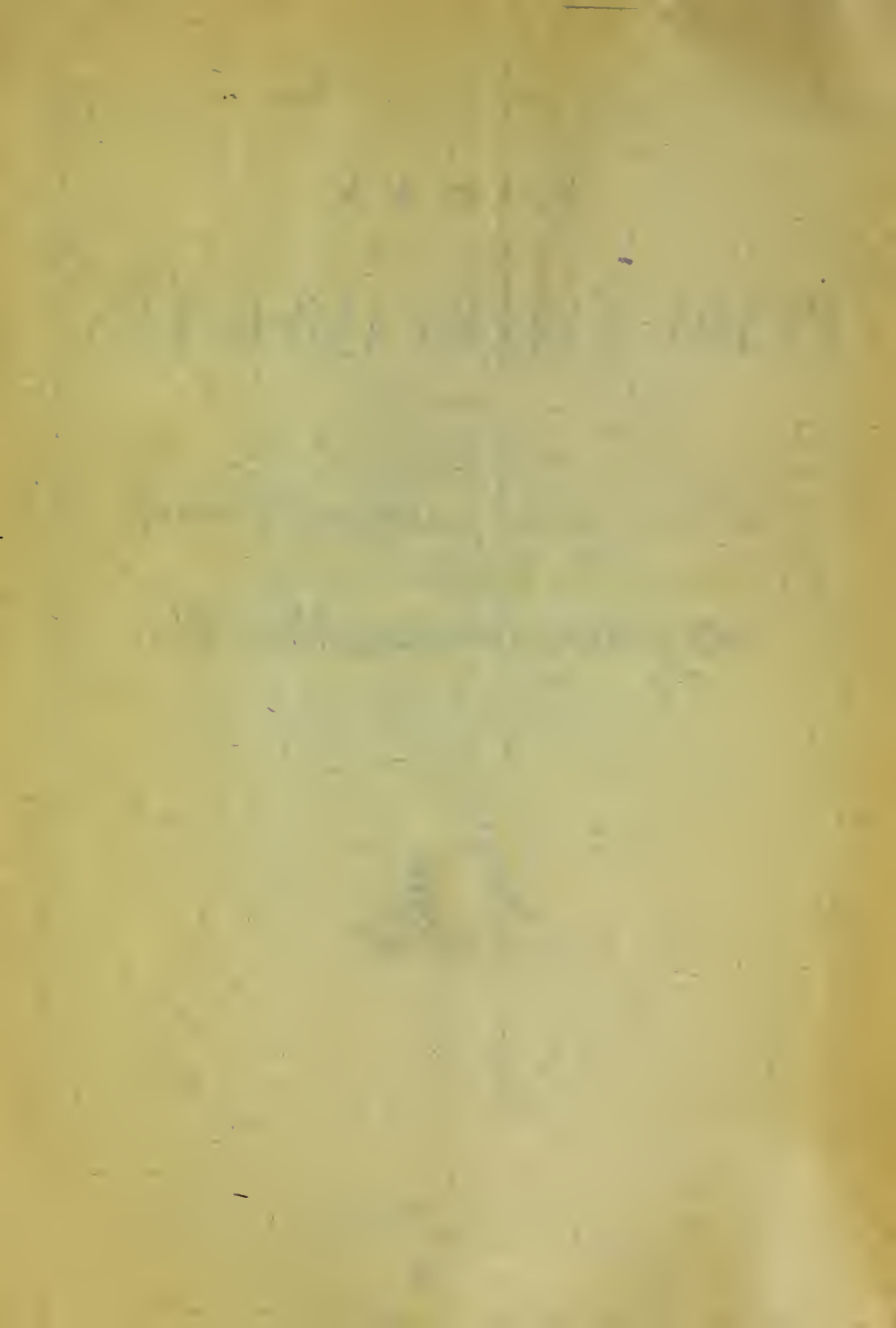
A STUDY PRESENTED
TO THE NATIONAL ACADEMY OF MEDICINE
BY

Eduardo Liceaga, M. D.

President of the Superior Board of Health, Director of the Hospital of Maternity,
Director of the Home for Foundlings, Professor of the Schools
of Medicine, Etc., and member of various
Scientific Foreign Associations.



CITY OF MEXICO.
MILITARY INDUSTRIAL SCHOOL PRINTING OFFICE.
—1892.—



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City of Mexico, May 3d 1892.

Hon. Manuel Romero Rubio, L. L. D.

Present.

My most esteemed sir and friend:

Of the poor and modest edifice of the "Peñon de los Baños" (Peñon Baths) left to us by Colonial times you have made a sumptuous establishment, which as far as elegance and comfort are concerned can rival those possessed by the water resorts of the Old World. You have discovered a hidden source of wealth which you have developed for the benefit of those who suffer, and which later on will redound to your benefit. At any rate you have utilized your wealth and your intelligence in endowing this Capital city with a bathing establishment which, within a few years, will be changed into a colony that can compare with those existing in European water resorts.

You did me the honor of charging me with writing a manual upon the use of the Peñon waters, and in compliance with your special recommendation, on my last trip to Europe I visited the water resorts of "Carlsbad" off "Franzes bad." I there studied the manner in which to derive the benefit of the medicinal waters, and also to convert them to the interests of the proprietors.

Examining the bath manuals there in vogue, I was convinced that they are not destined to impress the patients with the efficacy of the waters for the cure of their maladies, because said efficacy has been sanctioned by the experience of centuries and the authority of physicians the world over. Those manuals are but short essays in which the physicians of water resorts address patients reminding them only of the list of diseases to be cured

by a certain spring or geyser and the best manner of using water; but in Mexico it was necessary to act otherwise.

The structure which existed until lately did not deserve the name of Bathing Establishment. No physician in this city had devoted himself to hydrography; the knowledge had upon this subject was merely derived from tradition. It was therefore necessary to begin by undertaking a serious study of the diseases for which its efficacy had been demonstrated by experience, taking it as a basis for application upon others of close similarity to the preceding diseases upon which the waters had not been experimented; to base this reasoning upon considerations of a purely scientific order, that they might produce conviction in physicians, and from one deduction to another generalize the use of the waters to all diseases for which their use might be beneficial.

The public, I think, with their practical sense, can accredit a remedy or a treatment as useful; but I am sure that if the conviction can be made to take root in physicians that Peñon waters cure specified diseases, and it is demonstrated to them with scientific arguments that that which experience has taught is based upon physical laws, well defined, they will be the most efficient and most enthusiastic promoters of the new idea. On the other hand, the meeting in Mexico, in the month of November next, of the American Public Health Association, will afford us the opportunity of divulging in the United States the excellency of the Peñon waters, and you will have obtained the honor and benefit to which you are entitled for having undertaken an enterprise which is beneficial to the country. These are the reasons which have decided me in giving the essay, which I now present to you, the form it has, and to read it before the Academy of Medicine with the view of obtaining the approbation of the first medical corporation of the Republic.

Never the less, if you think that the form given to my work is inadequate for the ends to which you had destined it, do not publish it, but keep it only as a token of the affection and esteem professed to you by your friend,

E. LICEAGA.

City of Mexico, May 6th. 1892.

Dr. Eduardo Liceaga.

Present.

My most esteemed and distinguished friend:

I have been favored with your interesting letter written on the 3d inst., enclosing the notable work which you undertook in compliance with my amicable suggestions to the effect that you should make a scientific study of the Peñon waters, which springs exist at a distance of about four kilometers from this city.

The results attained by your essay correspond to the celebrity you have achieved by your love for science, by your patriotic sentiments, and by your life-long efforts for the benefit of humanity.

Really, you have embraced in a very few lines all the importance which the Establishment can attain in the future.

As you rightly say, in the Old World there is now no necessity to make known the good qualities of this kind of waters to alleviate the ills of humanity, because they are universally known, and all that is there necessary is to mention the diseases which can be cured by their use under the methods established by science and observation.

Notwithstanding that the Peñon waters were discovered since the Colonial epoch, they were not made known to us from the

point of view in which you have presented them in your conscientious and luminous study. From this moment they must call attention in and out of the country, and to you will most surely be due the benefit resulting to humanity by the medical application you have given them.

Your authority upon the subject, the deserved reputation you enjoy and the approval and assent which your scientific work has attained from our country's Medical Academy, are the best guarantee patients can have in seeking health at the bathing establishment with which I have been fortunate enough to endow this beautiful City of Mexico.

I renew to you my thanks for this service which, though it may turn out to my personal benefit, I consider as of still greater importance to our country. Yours sincerely,

MANUEL ROMERO RUBIO.



HYDROGRAPHY.

The Baths and Waters of Peñon,

With hesitation I present to the Academy this small essay upon the Peñon waters. The study of hydrology has not preoccupied our compatriots but until recently; and though it is true that the analysis of many thermal springs has been made, that one or two essays, as the one written by myself in 1880 upon "The Ferruginous Waters of the Villa de Guadalupe," that written by Dr. Leon Simon, published in Mexico in 1882 upon "The Waters of Peñon" and the one on the same subject presented last year to the National Medical Institute by Mr. Jose D. Morales, it is equally true that a guide for the use of the waters of that spring is needed.

In Europe therapeutics finds in the systematical use of "the waters" an efficient remedy for the cure of many diseases and is, besides, a source of public wealth for the cities fortunate enough to possess bathing establishments, attended by thousands of patients, attracted by the fame of the curative virtues of those springs.

Furthermore, the desire to call the attention of our men of science upon a subject of practical interest, the foundations of which secular experience has been unable to give as in other countries, nor the observation of physicians specially devoted to the study of hydrology, for we have had no bathing resorts, have encouraged me to undertake this light task which will necessarily be incomplete and imperfect, but which only aspires, as already stated, to remind sufferers that these are "waters" which can relieve or cure many of their maladies, and to stimulate my colleagues in the study of the rational application to therapeutics which can be made of them.

Mexico, February 24, 1892.

THE PEÑON BATHS.

Location.

In the Valley of Mexico, four kilometers west of the Capital of the Republic, on the western shore of Lake Texcoco, rises a small mountain known by the name of Peñon or Peñol of the Baths. At a short distance to the west and inclined somewhat towards the southeast, is the origin of the thermal waters which supply the baths there established. The mass of the mount is formed of volcanic porphyry which forms transitions with basalt. The stratum from which the water emanates is saliniferous limestone. "In this region signs of geological phenomena, especially volcanic, are observed, mention of which is not made in modern history, nor in the traditions and hieroglyphics of the ancient races of the Anahuac" as said by Messrs. Barcena and Castillo, from whose work upon "The Man of the Peñon" I take the data I consign.

The first of these gentlemen, in a letter addressed to me on May 15th of last year, and with regards to the formations of the spring, expresses himself thus: "As a case of frequent occurrence in Mexico and which I have observed, you can add the circumstance that when an isolated volcanic hillock or mount is found in a valley, it *almost always* contains a hot spring at its base, as in the case of the Peñon. The phenomenon can be accounted for in the following manner: If the mount is a place of egress joined to mountains and communicated to a subterraneous branch it may be believed that the waters, absorbed by the mountain and circulating through its mass, even to great depths, are heated in their transit and issue forth at the end of the counterfort. If the mount is isolated, of volcanic origin and raised from the center to the surface of the earth, in its passage it can force deep subterraneous currents, making passageways in its mass and leaving them a permanent channel.

"In both cases those deep waters supplied with the necessary properties for dissolving mineral substances, are carried by them to the place of egress. The second case could be that of the Peñon, for it is likely that the saliniferous stratum found there has begun to accumulate since the origin of the hot spring."

These ideas of our friend are those expressed by geologists apropos of the appearance of springs on soil of volcanic origin, on the mountains of Bohemia, where so many hot springs are found of such merited renown as those of Carlsbad.

HISTORY.

Rather than history, what we find in ancient books concerning the Peñon Springs about the time in which Aztec tribes inhabited the Valley of Mexico, is purely legendary, for neither in the works of the writers upon the Conquest nor those of the Colonial Epoch, nor in those of the present time are to be found precise data bearing upon the use of these waters by the ancient residents for the cure of their maladies. There is, however, a document that I do not wish to leave unmentioned, which is a letter published in "La Gaceta" of Mexico, on the 22d of December 1792 and written on the 22d of Sept. of the same year by Mr. Gabriel de Ocampo, Doctor of Medicine of the Royal Pontifical University, to Andrés Caballero, Esq., upon the virtues of the Peñon waters.

Said letter, where it bears upon the subject reads as follows:

... "The large quantity of mephitic gases and in regards to which experience proves that they extinguish candles and suffocate or otherwise kill small birds, is in my opinion the active cause which restores as if by magic the lost activity of paralyzed or semiparalyzed limbs. This is the gas which restores the necessary equilibrium in the circulation of the liquids and the muscular action of solid parts; and not only on these parts generally, but also on the small fibres of which they are composed, thereby resulting the total extirpation, or at least a notable and beneficial relief of the gout and rheumatism, the stimulation of suppressed organic functions, the restoration of the appetite, of the digestion and of the vital force. The copious perspiration which these baths excite and which may be supposed to weaken the patients is proved by experience to produce the opposite effect, for in each case it has been demonstrated that a reanimation is obtained which can only take place when nature is restored and when all noxious substances are eliminated. It should be observed that this copious perspiration continued for ten days or more and the baths taken three or four times a day produce the same good result upon patients under ten years of age as upon older ones.

"The salts contained in these waters, which professors are well aware to be laxative, combined as they are with a large quantity of gases and a high temperature are specially fit for producing the already mentioned effects of removing obstructions, loosening and dissolving the fibres without destroying their proper tone or vigor. This has been established by experience. Since these fortunate discoveries have taken place we must properly comprehend the true force and virtue of these waters in cases of gout, rheumatism epilepsy, hypochondria and hysteria as well as upon pulmonary and cutaneous diseases. These observations and remarks apply to prudent and cautious physicians, without whose advice the taking of these baths might be injurious. But while speaking of the necessity of this medical advice it seems opportune to refer to the abuse generally committed

in the selection of the hour or time for taking the bath with relation to meal hours, because they might be prejudicial even to persons enjoying a good health and could also alter or counteract their beneficent effect. However, even in these cases of abuse the results of the baths have been very often favorable and only in some instances in which they were taken imprudently have said results been positively injurious to the bathers.

"It should also be considered as an abuse worthy of attention, the fact that certain persons, in their desire to increase the power and efficacy of the baths, have not given sufficient care to ventilation, because carbonic gas is not fit to breathe and may produce suffocation. While getting our information it has also been stated to us, that people frequently go to sleep in rooms adjacent to the spring. This is imprudent, and it would be proper, on the other hand, to leave the doors open when the baths are not in use.

"If we wished to mention special cases wherein cures were effected by these waters, the list would be rather long, and moreover, a good many of the residents of this city are already cognizant of them; but if anyone should question the efficacy of the baths, he can easily see for himself, on any day of the year, as they are but three miles from the city, the ride thereto being easy and agreeable. A comparison between the invalids that enter and those that leave the baths after having taken them, will instill in anyone with the complete conviction of the efficacy of its waters.

"The fact that in some cases the desired effect has not been obtained does not seem to me to be sufficient reason for abstaining to speak in favor of the baths in this manner and with entire liberty, because sensible persons must admit that the observation of favorable effects produced in many cases and in a diversity of time and circumstances is sufficient to justify the efficacy of a remedy; moreover, it is a well known fact that in a large number of chronic invalids whose health had almost entirely disappeared these waters have produced a miraculous effect."

The old building which we have seen and which served for the foundation of the present edifice, was raised around a square courtyard, on a side of which a chapel exists still, preserved by the actual owner of the property, the other sides of which contained ample rooms of small elevation and basins dug in the ground serving as bath tubs. Said old building dates from the beginning of the Colonial Epoch and proves that systematic applications were made since then. As far back as we can remember the baths were neglected. Families in need of them took quarters in any of the rooms and the patient bathed two or three times daily, lying down to repose and to perspire, wrapped in the clothing brought by him, as in the establishment not even food could be procured as the inhabitants were so poor that they could not furnish bathers with articles of the first necessity.

There is no record that the waters were ever drunk.

The Bathing Establishment.

The actual edifice, plans of which I enclose, is composed of two principal parts: the lower part, in which the baths, the chapel, the dining-room, the kitchen, the saloon, the billiard-room and the apartments of the manager are contained, and the upper part, which contains the assembly-halls and apartments for the accommodation of invalids.

To the left of the entrance is the vestibule which leads to the upper stories by means of an elegant iron stairway, and to the baths destined for men. An ample and extensive *salon*, decorated in the Egyptian style, gives access to the bathing apartments. Each of these is composed of a small, well-decorated chamber, with a bed to rest on after the bath, a clothes rack and a wash-stand, also the door opening into the bathroom proper. This latter is an arched-ceilinged room which receives light from above, the floor of which is covered with blue tiles, where the water is brought by means of tubes that connect directly with the spring. Some of these apartments are designed for a single person, while others more spacious can accommodate a small family or serve the purposes of those invalids who, unable to move, may require the help of another person while bathing. At the back of this *salon*, which is spacious, well warmed and furnished with a center sky-light, is a room in which there is a huge shell, which closing in front, affords a steam bath from the vapor arising from the water on issuing from the spring. At the back of the courtyard already spoken of, is a passageway leading to the ladies' bathing department, which is enclosed by glass partitions to avoid the danger attaching to a cold draught on issuing from the bath. This department, which is in the Aztec style and adorned with groups of tropical plants, has on one side a consultation room for the physician of the establishment and a room containing bathing outfits. The light is furnished by a long sky-light. The side corresponding to the entrance has bath rooms better decorated than those of the other department. In one of the fronts of this *salon* is the one for the private use of the proprietor's family, which is composed of a sitting room, a resting chamber, an extensive and commodious basin, also a shower bath room. At the other end of the *salon* is a fountain of mineral drinking water, on one side of which is a narrow passageway leading to the spring from where the water which supplies the baths is elevated by means of pumps. Further on is a bath composed of a large resting chamber, a basin and a shower-bath.

The stairway of which we have spoken leads to the upper part of the edifice. To the left and at the end of a long, covered corridor, is a window which looks out upon the open country, producing the effect of

a painted landscape. On either side are habitations, well furnished and with plenty of light and ventillation. On the other side the vestibule leads to a grand, elegantly furnished *salon*, with large curtains and rich tapestry, and which is lighted by a row of windows that open upon a veranda covered by a roof sustained by thin columns, which place affords one of the most beautiful views of the Valley of Mexico, having before you in the first place the whole of the panorama of the capital: to the right the Villa of Guadalupe, to the left the canal and in the background the chain of mountains that encircle the Valley.

At a right angle to the *salon* is another of lesser dimensions, which also serves as a meeting place, at the end of which there is a corridor leading to another series of comfortable apartments for families, at the end of which a new spectacle is enjoyed: the western part of the Valley, with its tree-fringed boulevards and the placid and extensive Lake of Texcoco, whose waves kiss the territorial belongings of the edifice described. Close by are the Catholic church, the Manager's quarters, a billiard saloon and a large and well supplied restaurant.

To the right of the main building is the bowling-alley, of an elegant and picturesque construction; to the left is a large shed to shield vehicles from bad weather; to the front an artificial lake of fresh water and further on is the place for pigeon shooting, etc.

As already stated, on one side of the edifice is the mount from which the place derives its name, and from the summit of which a fine view is had.

Composition and Qualities of the Waters.

The first reference to the composition of the waters is found in a letter, already mentioned, written by Mr. Gabriel de Ocampo, which says in relation to the subject: "I will first refer to the preliminary examination made by said gentlemen (the members of the Royal Commission of Botanists) in May, 1791, after which I will endeavor to explain the reason of the marvelous results given by these springs.

"In the first place the aereometer sank entirely in the water and the thermometer marked a temperature of continual ebullition.

"In the second place there was a great evolution of stationary gases with which the water is charged.

"The third analysis revealed sea salt mixed with magnesia; the fourth, nitrate of magnesia; the fifth, selenite or sulphate of lime, and finally some iron." (Selenite is the old name for sulphates of lime and other alkalies).

The first and exact analysis of the waters of the primitive spring, to my knowledge, was made by Mr. Leopoldo Rio de la Loza, a distinguished Mexican chemist, and produced the following results:

GAUESOS PRODUCTS.

Air	6.2
Carbonic acid	63.3
Nitrogene	28.8
Water vapor	1.7

Total cubic centimeters per litre..... 100.0

SOLID PRODUCTS.

Sulphate of lime	0.029
Carbonate " "	0.056
" " magnesia	0.256
" " soda	0.341
Chloride " sodium	0.480
Silicate " potash	0.147
Iodide " potassium	traces
Alumina	1.016
Iron and manganese	traces

Total in grammes per litre..... 1.325

Density, 1,00165 to 20°

Temperature, 44°5.

In the year 1882 Mr. L'Hote, an expert chemist of the Conservatory of Arts and Trades, of Paris, made the following analysis of the waters:

GRAMMES.

Carbonate of soda	0.1834
" " potash	0.2945
" " lime	0.4039
" " magnesia	0.4286
Sulphate " soda	0.0074
Phosphate " "	0.0013
Borate " "	traces
Chloride " sodium	0.7366
" " lithium	0.0060

Silica	0.1522
Alumina.....	0.0012
Oxide of iron.....	0.0009
Organic matter.....	traces .
Per litre.....	<u>2.2160</u>

On the 31st of January, 1891, Mr. José D. Morales, Professor of Pharmacy and member of the Superior Board of Health, presented to the National Medical Institute a study upon the Peñon waters, from which the following analysis is taken:

Composition of the Water of the "Peñon Bath" Spring.

PHYSICAL AND ORGANOLEPTICAL CHARACTER.

Aspect of the hot water spring, with gaseous bubble discharge.

Limpidity, complete.

Color, null.

Odor, null.

Taste, slightly pungent and salty.

No unctuousity to the touch.

Density, 1.00263 to 18° C.

Average temperature, 46° C.

Reaction, at first acid, afterwards alkaline.

Quantity of stationary matters obtained by means of the evaporation of a litre of water, desecated to temperature 100° C., 2 grammes 23.

CHEMICAL COMPOSITION.

The gaseous mixture which arises is composed of

Azoe.....	68
Oxygen.....	4
Carbonic acid.....	28
Total.....	<u>100</u>

STATIONARY SUBSTANCES.

One litre of water contains:

	grammes.
Sulphate of lime0864
Phosphate of "	0.0058
Bicarbonate of lime.....	0.2385
" " magnesias.....	0.7892
" " soda.....	0.2002
" " potash.	0.1250
" " iron.....	0.0011
Chloride of sodium.....	0.9875
Silica.....	0.1620
Alumina.....	0.0599
Manganese, lithina, boric acid, iodine and organic matter	traces
Total.....	<hr/> 2.6556

That the qualitative composition of the water has not changed results from a comparison of these three analyses, but not so with regards to the various substances. This is observed in all springs and does not signify an error in the analysis. The same happens with the temperature, as in this case that of the Peñon waters was lower when taken by Mr. Rio de la Loza (44°5). According to Mr. Morales' essay the lowest temperature does not drop below 45°C, and in one of his observations it rose to 47°5; in the spring it varies according to the time of the day and the season. Further on I will give the temperature of the water in each of the bathrooms. A curious fact is that when the pressure of the spring is diminished, as when the water is elevated by means of pumps, not only is the quantity of the water increased, but also its temperature.

The water issues from the spring tumultuously, on account of the gas discharges, forming a great quantity of water vapor

The water is colorless, transparent, odorless, and slightly pungent and salty to the taste. It gives blue turnsol paper a slight, reddish color, by reason of the carbonic acid it contains; but when boiled it gives alkaline reaction (Morales.)

CLASSIFICATION.

When a mineral water is discovered or studied, the idea to compare it with existing and well studied ones is had; but as different medicinal waters differ so much in their composition, they have been grouped—that is, classified. The chemical composition of each spring is perfectly known, and if classification was to be based on it, it would not be so difficult, but as practical application in specified diseases is what interests the physician, and as therapeutics has not reached perfection, essays on classification are as yet systematical, as in some epoch those of natural history have been. Taking, for instance, the analysis of Mr. Morales, it shows that the dominating salt is chloride of sodium (0.9875) Bicarbonate of magnesia (0.7892) comes next; then bicarbonate of lime (0.2385); then that of soda (0.2002); that of potash (0.1250); that of silica (0.1620); alumina (0.0599); sulphate of lime (0.0864); phosphate of lime (0.0058); bicarbonate of iron (0.0011); and traces of other substances.

If in classification acids are taken for a basis, it will result that carbonic dominates and that chlorhydric comes next. The bases in greater proportion are soda and magnesia.

The basis adopted by hydrologists (Le Brest) for the chemical classification of water is the predomination of an acid; thus in this case carbonic acid has first place, whilst chlorhydric comes next, and in the bases, soda; therefore, the classification will be: Bicarbonated water, chlorided sodiated.

Therapeutical classification will come after final experience may confirm or weaken the views which I now initiate, but to which I will try to give a scientific basis.

The one which served for the best known springs, such as those of Vichy, Carlsbad, Spa, etc., and which is set down in manuals either possess ideas not in accordance with actual knowledge or is based upon experience. This latter consideration is unquestionably the best, and it is that which has made the reputation of the large bathing establishments which exist in Europe and are attended by thousands of invalids from all parts of the world. At the Peñon Baths said experience is limited by reason of the limited number of the diseases; but it shall serve as a basis for application to other diseases so akin to the former, that we can advance that if cure is obtained in the latter, the same must necessarily be the case with the former.

A fact thoroughly investigated by tradition, by the experience of physicians who have preceded us, as also by my personal research, is that the Peñon waters cure arthritic diseases. The cases we can cite are so numerous, the results so evident and the cures so efficacious, that at the actual moment they afford conviction to the present generation.

The relationship between gout, obesity, biliary lithiasis, diabetes, and the numerous conditions derived therefrom, is demonstrated by direct observation upon invalids presenting those ailments simultaneous or successively, or alternating between them; it is demonstrated by the manifestations which precede them, as in rheumatism; which follow them or serve them in transition, as in migrain, neuralgia, sciatica, nettlerash, boils, skin eruptions, etc., which accompany the principal maladies, link or otherwise follow them in their progressive development. It is demonstrated by heredity: in the ancestors of gout sufferers obesity, articular rheumatism; asthma, diabetes, renal gravel, eczema, biliary lithiasis, hemorrhoids and neuralgia have been found (Bouchard). It is demonstrated by the identity or the similarity of the causes which produce them: succulent nourishment, rich wines, a sedentary life and causes which bring on rheumatism. Finally, it is demonstrated by the fact that the same water, that of Carlsbad, for instance, cures those various maladies.

If, then, the Pilsen water cures one disease, we can infer that it will cure the others above mentioned; but, moreover, we can give direct proofs taken from nature of the characteristics of one or several of those diseases and of the action exercised thereon by the water by means of its temperature or composition. The characteristics of arthritic maladies, particularly the gout and rheumatism, are the excess of uric acid, uricemia demonstrated by direct analysis, and the deposit of urate in various organs, especially in the periarticular textures, etc. These alterations result from a benumbedness of the nutritive functions.

The baths act upon the economy by means of their temperature increasing or decreasing the temperature of the body through the physical action of conductivity; but mainly act upon nutrition by means of the nervous system.

Regnard's experiments have demonstrated that organic combustions increase by the increase of temperature, but that beyond a certain limit carbon ceases to burn, and that when it does not burn grease augments.

Temperature increases pulmonary ventilation: thus, instead of 600 litres of air per hour the lungs can absorb 1500. Cold increases urea, carbonic and uric acids. Heat increases urea and carbonic acid, *but decreases uric acid*.

In reviewing we have this: that the variation in central temperature, direct or indirect, acts upon nutrition; increased temperature activates it, whilst decreased or lessened temperature disorders it. But on the side of central temperature variation there is in the application of heat and cold an action which results from a peripheric nervous impression upon nutrition. Both actions frequently combine, accumulate, and can even be neutralized (La Gendre).

This is with regards to temperature and without considering the

perspiration which follows upon a bath, which increases secretion and excretion by means of the skin.

If we refer to the composition of water we find that physicians, the world over, recommend the use of alkalies: Leeorehe, in treating of the gout, says that *bicarbonated sodicated waters should be preferred in cases of gout*; that strong waters should be used for vigorous persons who suffer intense attacks, and weak waters upon those afflicted with visceral irregularities.

In chronic rheumatism the treatment preferred by Chareot, based upon his personal experience is the one by alkali in high doses.

If then, it has been demonstrated that on the one hand there is an increase of uric acid in gout, and on the other that carbonated sodicated waters by their composition, and hot baths by their temperature diminish the uric acid by the modification which they bring to bear upon nutrition, we will have the scientific basis needed to say that the Peñon waters cure arthritic manifestations.

This fact, as already stated, is furthermore demonstrated by experiments on these same waters. As in the group of maladies enumerated gout is the most characteristic, and is caused by slow benumbedness in nutrition, and as its cure requires also a slow change in the nutritive functions, we have the right to apply the precepts referring to them to all those others characterized by the same nutritive torpor. Bouehard, the modern and eminent Neurologist, of broad and elevated views, considers biliary lithiasis, diabetes, obesity, etc., in the same group as gout; therefore we are treading upon firm ground when we assert that the Peñon mineral waters are efficacious for the treatment of those diseases.

Before entering into details, we must make this declaration: mineral waters are a very potent factor in the cure of chronic diseases, but they are not the only one. The other factors are: diet and other resources of hygiene; to undergo treatment for a long time; occasional change of place and frequent change of habitation. Thus, then, to obtain all the desirable benefit from the water, it is necessary that the patient who is going to submit to these conditions shall follow the regime advised by the physician; but it would not be superfluous for him to know some general rules, which we will try to explain as briefly as possible. In the bathing places of Europe, not fashionable meeting places, but sanitary resorts, patients change their habits entirely, and for the purpose of making the range of this change understood, we think it prudent to state what is done by patients at Carlsbad. After having passed the winter in large cities, retiring after midnight and even towards early morn, after attending dinners, theatres and balls, rising at noon or shortly before, partaking of stimulating food, generous wines and champagne, passing the day in the interior of heated rooms; the spirit troubled with business cares, passions, reverses of life, or excited or exhausted by pleasure; in summer

they arrive at Carlsbad, where spring has covered with vegetation the hills that border the long glen through which the Teple flows. That vegetation vivifies the air with its exhalations, in contrast with that of the cities. The bathers rise at six in the morning and go to the fountain recommended by their physician, and taking the water from the spring itself, warm as it is they drink it in small draughts and begin to walk up and down the large galleries, some sustained by imposing Corinthian columns, like that of Mühlbrunnem, or by iron or crystal columns, like that of Sprudl and the one of Hygia. The bathers, keeping always to the right, walk slowly, taking small draughts whilst listening to select pieces executed by one of the excellent Austro-Hungarian bands, occupying a side gallery. Nearly an hour is devoted to this, when they walk along the river banks in search of the remotest coffee saloon, where breakfast, composed of excellent bread and milk, coffee and milk or light chocolate is procured. Thence they retake the road leading to the hotel, or make excursions through the long lanes that wind round the mountain slopes to prepare for the bath. The baths are within the city itself, on the sides of long covered corridors but provided with abundant light and the comfort suitable to these resorts. After the bath the ladies make their toilette preparatory to going to dinner. Nearly all the restaurants are open air concerns; the menu is very simple, containing neither *foie gras* nor seasoned dishes; dinner is composed of fresh fish, eggs, meats simply prepared, mild white wines, etc. After this repast the bathers visit their friends, go to the libraries or repose in their quarters. At four o'clock in the afternoon, they begin to sally forth in search of their favorite promenade in the outskirts, the park where the orchestra is to play that afternoon or go on new excursions on foot through the lanes. Towards sunset they gradually assemble in the restaurant where a concert will be given, whilst partaking of food as simple as the morning meal, though composed of more dishes, the orchestra in the meanwhile executing well selected pieces. At eight o'clock in the evening they are on their way to their quarters, and retire at 9 p. m., to go through the same routine on the following day.

It suffices to present this contrast between life in winter in large cities and life in summer in "water resorts" for the comprehension of the fact that to all that is due in the cure of disease must be added what corresponds to the sanitary life lead by the patients.

Patients who frequent the Peñon baths must bear in mind that nearly all diseases cured there have greatly modified their constitution, and to restore it to its primitive condition it is necessary to attend the baths for two, three or more seasons; that those who are addicted to strong liquor or use it in excess, must abandon it; that they must exchange succulent food for simple nourishment; that they must do muscular exercise, exercise on foot or on horseback; attend to gymnastic exercise advised by

their physicians, to the regular alternatives of labor and rest and to rise and retire early. This advice is adapted to the greater part of the patients.

The exceptional location of the Peñon baths in the Valley of Mexico, nearly 3,000 metres above the sea level, with a climate which is neither rigorously cold nor excessively hot, is most suitable to many patients residing in our hot climes on the coast, or to those who live in places outside the tropics. This exceptional location permits bathing in all seasons.

Manner of Using the Waters.

The baths.—The average temperature of the water of the spring is 46° centigrades, but varies naturally in each room, as may be seen by the table given below. Of course, these figures are susceptible to a change, for instance by leaving the water get cold, or by modifying the pressure in the spring, etc., but they can serve for a basis, as they are given by a thoroughly reliable person.

Baths for men.—Temperatures taken at 9 a. m. of the 27th of August, 1891, at the tap itself:

Number	1.....	41°4
"	8.....	41°6
"	9.....	40°9
"	10.....	42°7
"	12.....	39°1
"	14.....	41°6
"	15.....	41°7
"	17.....	42°4
"	18.....	41°8
"	19.....	42°4
"	21.....	42°0
"	22.....	41°4
"	23.....	41°1

Temperatures were taken immediately after the water had been elevated by the pump and distributed. In the basins it lowers a little, and half an hour afterward decreases 3°. The spring water itself was at that moment 44°9. The temperature of the saloon leading to the bath rooms was that day at 9 a. m. 20°7.

Physicians should inform each patient as to whether from the

beginning he should take his bath at the temperature of the water coming from the spring or after reducing it to 33° or 37° with colder water from the same source. Physicians should advise as to the duration of the first bath, the time to encourage perspiration, etc., also as to the advisability of taking but one or two baths daily, in which case the precise time should be fixed separating it from meal hours; all this, of course being subject to the nature, length of time suffered and intensity of the disease. In the case of feeble persons or those who suffer great weariness after bathing, the daily single or double bath may be taken every third day or but twice a week, at least in the beginning. According to the first effect produced, the temperature, duration, permanency etc. of the bath may be changed; the head should not be washed, nor soap used on the skin, only on rare occasions, as these baths are not for exterior cleansing purposes. On leaving the bath the patient must retire to the bed contained in each room for the purpose of furthering perspiration, when so required by the disease. When perspiration stops, or the time in which to encourage it expires, the skin should be dried with a towel and afterward rubbed down gently. The patient must not issue abruptly from the building, but should walk up and down the large saloon which leads to the baths, the temperature of which is mild, as has been stated.

Water Used in Potation.

Customarily, Peñon waters have never been used in potation, which is a great error, as the substances dissolved in the water are not absorbed by the skin. In European water resorts, the principal mode of treatment is by potation, which is understood when considered that the medicinal substances contained in the water are what gives it its principal properties. The quantity of water that should be taken varies naturally according to the nature of the disease; but it should begin by taking half a glass or more, and slowly increasing this amount, but never reaching those quantities taken long ago in European springs, which amounted to many litres.

The waters should be taken warm, such as it issues from the spring, in small draughts, at short intervals; and ingestion is facilitated by walking up and down the corridors of the bathrooms.

Rheumatism.

It is a fact recorded in the letter written by Dr. Gabreil de Ocampo to Mr. Andres Caballero, on September 22nd, 1794, that the Peñon waters

were at that time applied to the cure of rheumatism. This fact is confirmed by tradition and supported by the experience of physicians who have preceded us as well as by our personal observation. None of the pharmaceutical means, including salicilate of soda, determine more quickly the cure of pain or lead to more rapid relief which continued produces more lasting benefits than the use of the Peñon baths; wherefore we can assert that diversity of form in rheumatism is what takes the largest number of patients to the baths. Subacute, chronic and muscular rheumatism are relieved after the first baths, and it is interesting to see patients brought for the first time in the arms of friends or servants, afterward come simply supported by someone and later leave on foot, unassisted. These are the patients who should take the baths with preference, repeated in the same day, take them frequently, prolong them according to their strength, seek abundant perspiration, repeat them during a season in two or three following years; but, moreover, damp and low habitations should be avoided and those facing North or West preferred; to wear light, woollen clothing in summer and heavier garments in winter; to exercise on foot or horseback; avoid sudden cooling off; diminish the total quantity of food taken; above all to diminish beef, mutton, eggs, and other food containing large quantities of azoed substances; to abstain from alcohol and wine, the latter to be indulged in but little and mixed with water; not to remain long in bed, lead an active life, etc.

Gout.

The same as rheumatism gout has been considered as one of the diseases cured by the waters of Peñon. This disease is specially mentioned in the letter to which I have alluded.

Gout is the type of diseases produced from torpor in nutrition, which are hereditary, which take more time in making their evolution, are developed generally in persons leading a sedentary life, those who partake of highly seasoned food, drink generous wines, sleep much, work little and "live high." Persons suffering from this disease need a radical change in their habits, a long sojourn at the baths, to take them frequently, prolong them as much as possible, drink the water not only on leaving the bath but also with their meals, prolong its use a long time, and conform active life, regularization of sleep, labor and pleasure, the nutritional functions so deeply altered in them, to physical exercise. Not only actual gout sufferers could drink these waters, but also those subject to the disease by heredity or those having some of the attributes which characterize these patients, or those suffering maladies bearing nosological relationship to gout or are lesser manifestations thereof, such as boils, net,

ticlrash, herpes zona, arthritic eruptions, megrim, dyspepsia, vertigo, palpitation, etc. Also this refers chiefly to chronic gout.

In acute gout fluxionary evolution and crisis are the means resorted to by the organism to activate circulation and make the deposits of the articulations and of the fibrous texture disappear; and the attack of acute gout is so intense that it does not permit of going to the baths, which would be inadvisable from a therapeutical standpoint, as shown by the best medical experience.

Rheumatism can coexist with gout, and it is difficult to indicate the part corresponding to each in their manifestations (Le Gendre); but this is no hindrance in the present case as the bath treatment as the same.

Biliary Lithiasis.

Biliary calculi are the appreciable manifestations of another form in torpor of nutrition. The relationship which links this pathological state with those just mentioned, is taken from a book recently published in France. Mr. Bouchard has demonstrated by analyses in 51 observations the association of biliary lithiasis to arthritic diseases. The frequency of rheumatism, gout and asthma in lithiasic patients has been pointed out by Noel Guenau de Mussy. The coincidence between biliary calculi and renal glands has been shown since the time of Baglavi and Morgagni down to Willemin.

In the pathological antecedents of lithiatic patients are found the same allied diseases which we have shown in arthritic patients—nettle-rash, eczema, herpes zona, neuralgia, megrim, hemorrhoids, etc.

This well established relationship to the foregoing diseases might induce us to apply the use of the Peñon waters even were it not that there are observational facts to prove it.

The retention of the bile in the passages and in the biliary vesicle favors the formation of the calculi, contributed thereto by sedentary habits, abundant food, sorrow, mental worry and all causes which disturb nutrition generally and the nervous system particularly—may be because of making disassimilation of the nervous texture excessive and setting cholesterine at liberty.

From the study made on the productional mechanism of the biliary calculi results that the local circumstances which favor the precipitation of cholesterine are the great quantity of this substance in the bile, the concentration of this liquid, the abundance of free, oily acids, of organic acids, of lime, the slight alkalinity of the bile, its difficult flow or its retention in the biliary vesicle.

The reunion of these conditions is commonly found in diseases of the biliary passages. Special studies which I made a long time ago and which I intend to publish, have convinced me of the notable frequency on these sufferings in the city of Mexico, now isolated, now accompanying the disorders of the duodenum, the stomach, the liver, or again being the expression of general conditions, as already mentioned.

The use of the Peñon waters, regularizing nutritive functions, combating duodenum and stomachical catarrhs, chronic liver disorders and the constitutional diseases of which we have spoken, will contribute to remove the causes which act through this mechanism, but must be assisted by a dietary method. Therefore, if blood, meat, brains or if eggs contain cholesterine, it would be convenient to eliminate or diminish them. To favor the abundance of fatty acids, fats should be permitted, but also associated to the alkalies supplied by the waters. Green vegetables and fruit are suitable. A diminution of sugar and feculent substances will complete what relates to the method. Suitable laxatives and rhubarb will facilitate the excretion of the bile, and exercise, active life and the removal of moral causes will change the conditions which produced biliary lithiasis.

Renal Lithiasis.

Calculi in the kidney and the *gravelle*, as the French say, constitute an illness which is common, though not so much so as the one we have just discussed, but so closely allied that I cannot refrain from alluding to it.

Phosphatic gravelle is produced by alterations of the vesical wall which makes the urine alkaline. When this liquid loses its acidity the phosphates are deposited and originate the concretions which form by themselves the calculi, or which serve them as a nucleus. Phosphatic gravel is, then, a disease of the bladder, and I shall only treat, for the time being, of uric and oxalic gravels.

The morbid relationships to the *gravelle*, says Le Gendre, are the same as those of the other arthritic diseases.

The circumstances which augment the production of uric acid are very abundant food or too rich in azoe, the insufficiency of beverages or the excess of those which are acid, or gaseous and sugared, as champagne; insufficiency of muscular exercise or fatigue, imperfection in the functions of the skin, a sedentary life, respiration of confined air, etc.

The circumstances which facilitate the precipitation of the uric acid are the concentration of the urine and the increase of its acidity by acid phosphates. The two united circumstances originate uric gravelle, which

is the most common. The foundation for the treatment is then, nourishment—the diminution of azoed substances, principally in eggs and black meats, tolerance in the case of white meats, predomination of the vegetable method, active life, woollens to avoid colds and the abundant use of the water for its mechanical action, and the use of the Peñon waters for their chemical action and as modifiers of nutrition.

Sugared Diabetes.

Since clyrical science has introduced in daily practice the examination of the urine, diabetes in its incipient state and before grave symptoms reveal it, is frequently found.

The relationship of this disease to the others referring to arthritics is so important that I cannot omit to transcribe the figures which manifest it in Bouchard's work. "In the parents of persons afflicted with diabetes," says the author, "rheumatism is found in 54 per cent; obesity, 36 per cent.; diabetes itself, 25 per cent.; gravel, 21 per cent.; gout, 18 per cent.; asthma, 11 per cent.; eczema, the same proportion; megrim and biliary lithiasis, 7 per cent. respectively. Among personal antecedents of diabetic patients, now as prior diseases, now as coexistents with diabetes, the same author has found: obesity, 45 per cent.; muscular rheumatism, 22 per cent.; megrim, 18 per cent.; acute muscular rheumatism, 16 per cent.; eczema, 16 per cent.; biliary lithiasis, 10 per cent.; chronic articular rheumatism, 8 per cent.; neuralgia, 8 per cent.; nettlerash, 6 per cent. etc."

A fact worthy of mention is that in Bouchard's statistics the existence of female biliary lithiasis is found in the proportion of 33 per cent.

By the figures just given it will be seen that obesity is in the proportion of 45 per cent., but in one of Seegen's statistics it reaches 52 per cent.

These figures are sufficient, I think, to establish the relationship between diabetes and the other arthritic diseases, and consequently to make the following deduction: that if in regards to the latter Peñon waters are unquestionably efficacious they must be so regarding the former.

I have made a close study of those nosological relations between diseases benefited by the use of alkaline water, because in Mexico Peñon waters have never been recommended in cases of diabetes, and I think, unreasonably, for if what I have stated does not suffice, I beg to remind of the fact that Carlsbad waters are frequented by a great number of diabetic patients, in every stage of the disease, and these patients find there a great relief to their sufferings. Well, then, Carlsbad waters are recommended to biliary calculi patients and are of undoubtable efficacy to them; as can be proven by the fact that Mexican patients have gone and

obtained there a cure for which they had vainly sought in the best established therapeutics and method; and having shown that biliary lithiasis and diabetes are of the same family, therefore it follows that if Carlsbad waters cure those two diseases, those of Peñon can also cure them.

Obesity.

The physician considers, rightly, a morbid condition what is commonly thought to be a deformity.

Obesity depends from torpor of nutrition which develops a texture (the fatty texture) at the expense of others. This texture, accumulating upon the organs, impedes their functions, alters their structure and can go as far as to entirely impede their action.

What has been said in the foregoing paragraphs about the relationship between different arthritic diseases spares us the repetition of arguments to the effect that obesity is one of those of the group. Obesity is found in gouty, lithiasic, rheumatic and diabetic patients etc. Obese persons, on their hand, have had ancestors afflicted with diabetes, gout, rheumatism, lithiasis, etc. and in their own case many of those conditions coincide, have preceded their actual state or are to be developed subsequently.

These manifestations of the disease do not offer the same importance in the different organs. The excess of fat under the skin, deforms: but its deposit on the omentum now obstructs intestinal function; on the liver it impedes the infinite action of this important viscera, and the accumulation of the adipose texture upon the mediastinum impedes respiration and circulation more or less.

Obesity contributes to or prepares for anemia and predisposes for great complications. In women it develops amenorrhœa and is a sure cause for sterility.

The basis of treatment is the change of habit, but especially regarding food. The quantity of food, to which obesity is generally attributed, is not the most frequent cause, but it is so in the abundance of flour sweetmeats, wherefor these should be omitted or considerably diminished. Milk and eggs should be used by obese persons, inasmuch as they are characterized as complete food.

The question of drink appeared to be settled definitely, but such is not the case as yet. In the majority of cases abstention from drink is the rule. It is necessary to consider that a greater number of obese persons not only drink water, but also wine and alcohol; were it only for this cause beverages should be diminished. Exercise should be increased,

especially before breakfast, doing gymnastical exercise, and to favor the functions of the skin which act upon the nervous state.

Alkaline carbonates favor the oxidation of greasy substances, they form soluble soaps with fatty acid existing in excess, and should be administered internally; for that reason the application of Peñon waters is found in this case. But the baths are also useful, by reason of the temperature contained, which increases the consumption of oxygen, the production of carbonic acid and the direct oxidation of adipose substances.

Other Arthritic Conditions.

It is sufficient to remember that megrim, the different forms of neuralgia and sciatica especially, are often manifestations of arthritism to show the suitability of the Peñon waters.

Asthma, eczema, nettlerash and boils of arthritic origin are cured by the Peñon waters, because they modify the deviations of nutrition which originate those various conditions.

Stomach and Intestinal Catarrhs.

One of the most common diseases is chronic stomach catarrh. Coarse, too abundant, highly seasoned or excessively greasy food develops this disease and maintains it. Another frequent cause is the continued use of alcohol, so widely spread, above all before meals, when, the stomach being empty, it can produce without hindrance its irritating action upon the mucous membrane of this organ.

One of the forms more frequent is chronic catarrhal inflammation, is the one which is accompanied by excess in the production of gastric juice, and especially by increase in the quantity of chlorhydric acid.

Alkalies in large doses combat this condition, and this vulgar and very old practice has found its confirmation in the study made by chemistry upon digestion in cases of stomach disease. But besides this special action of alkalis, there is another which is common to the catarrh of other mucous membranes when it takes its chronic character and unites to modifications in the nutrition of the whole texture of economy.

The waters of Peñon, which in their principal components contain carbonate alkalies bear out this indication, and by reason of the chloride sodium which they also contain they excite digestion, as well as stimulate the movements of the stomach through carbonate acid and collect-

ively acting upon general nutrition, as we have endeavored to show further back. These views are sanctioned by experiments on waters containing similar substances, such as those of Vichy, Carlsbad, Ems, etc.

The use of the water in these diseases must be chiefly by drinking it.—to take small draughts, neither too hot nor too cold, (unless specially prescribed); to drink it at meals, continuing it for a long time and to sojourn twice or more at the Baths.

In stomach as well as chronic intestinal catarrh, it will not suffice to drink the water, but also to establish a diet suitable to the diseases of the different portions of the digestive tube, and to advise abstention from wines and liquors, and the removal of causes which act upon the nervous system and of all others that may have contributed to the appearance of chronic inflammation in the mucous membrane.

Nasal and Pharynx Chronic Catarrh.

We could refer to the above paragraph in what it relates to the application of mineral waters to chronic inflammations of the nose and throat, did we not wish to call attention to the local use which can be made of these waters. In the larynx, but especially in the nasal part and the nostrils, mucous secretion is accumulated, extending and forming films, at first drying and adhering to the tissues, causing uneasiness thereto and hindering their functions; then they alterate and shelter germs which determine the various forms of inflammation, which lead to ulceration and make those diseases chronic.

Alkalics dissolve the mucus, and applied to irrigation and gargarism have a chemical action, and physically drag to the exterior the altered products of secretion and prepare the way for antiseptic or more profoundly modifying lavatories.

For these diseases the waters should be used in potation, specially so while bathing, as modifying the functions of the skin and acting through the intermedium of the nervous system, they act upon general nutrition.

Analogous considerations might be offered concerning chronic catarrh of the vaginal mucosity; but as these are linked to constitutional diseases already discussed or to the ills of the womb and their allies, I prefer to discuss them while treating upon genito-urinary diseases.

Diseases of the Liver and the Biliary Passages.

Catarrh of the biliary passages, the more or less complete obstruction of these channels, and the colics occasioned by the calculi called hepatic, have been studied apropos of biliary lithiasis; but I do not wish to omit making special mention of the first of these conditions, because it is very frequently linked to catarrh of the duodenum and of the stomach, and then it recognizes the same causes as the latter and must be treated in a similar manner, from an alimentary standpoint as well as from that of the internal use of the Peñon waters. Still more: the catarrh, by accidentally diminishing the caliber of the cystic and choledochical channels, causes the retention and thickening of the bile in the vesicle, to excentrically compress the walls of this receptacle, causing pains by repletion similar to those produced by calculi, determining the same phenomenon.

All disorders consequent upon biliary retention were known in olden times and treated empirically by alkalies, in Europe by the waters of Vichy, and in an astonishingly successful manner by those of Carlsbad.

The action exercised by alkalies on all mucous catarrhs is now known; also its dissolving action upon mucus, the saturation of fatty acids in excess forming soluble soaps, the chemical modification which they cause gastric juice to undergo in the form of dyspepsia with superacidity, and the effect of alkaline waters: hence the efficacious application of those of Peñon is explained.

All these considerations have their application in the case of biliary calculi, which are advantageously treated by the use of the waters we are discussing, and amongst us experience has already confirmed the precision of these views.

Liver diseases, as yet, have not been systematically treated by the waters of Peñon, or, at least, I have no knowledge of experiments having been made in connection therewith; but the unquestionable application to biliary passage diseases, leads us, as by the hand, to consecutive biliary schirrus, to the retention of bile in biliary passages and to hypertrophical schirrus with icterus, which can come in a primitive manner, which can and should be treated in the same manner, as much from a dietetical standpoint as from that of the application made of the waters we discuss.

Chronic inflammations, before the injuries attain an advanced stage, even when arising from the abuse of alcohol, *pulque*, or highly stimulating food, such as red pepper, etc., are susceptible of relief by means of the Peñon waters, on condition that the habits of the patients are opportunely modified, that they be submitted to suitable alimentation, that hygienic resources be associated to those taken from method, and which experience has shown to be useful in hepatic diseases.

In all diseases of this group, the use of the waters must be chiefly in potation, taken, besides, with every meal, continued for a long time, and the *cure*, as it is called in Europe, must be repeated for several seasons. This is the case in which to remember that each patient must be studied in his constitution, in his family antecedents, in his personal pathological antecedents, in his habits and customs; to advise him of the plan he must follow, and consequently, that the physician who habitually attends upon a family is the one to point out the details of the cure, for the only object of this writing is to establish the general bases of the treatment

Diseases of the Genito-Urinary Apparatus in Woman.

Tradition tells us that the Peñon waters have been applied from time immemorial to the cure of sterility in woman, and some facts we have observed confirm this manner of thinking. The opinion of my colleagues for the purposes of this article was to be desired, but those to whom I addressed have not answered as yet; and the Gynecological Society, whose opinion I solicited through its President, I am told has not been able to consider the matter as yet, for which reasons I am compelled to treat the subject with the general data with which science may furnish us; and hoping that eminent men may devote themselves to this study, I will set down what experience has taught me upon the subject.

Beginning with the undoubtable fact that many female patients have seen their sterility disappear after the use of the Peñon waters, and by analyzing cases known to me personally, I have been able to arrive at an investigation of some of the precise indications of this treatment.

The most numerous facts I have succeeded in observing, are those of chronic inflammation of the womb consecutive to imperfect involution, with chronic endometritis, in which cases the use of the Peñon baths have made the increase of volume of the organ disappear, as well as sensibility and congestion, and a state of pregnancy has been attained, after long years of suffering from the disease and complete sterility.

Endometritis without inflammation of the womb, without probable complication of allied diseases and being the only cause of sterility, I have seen cured and eventually permit of pregnancy.

I have seen the cure by the Peñon baths of chronic parametritis (not infectious) and I can cite a very recent case to prove this assertion.

In some cases I have observed, two or three chronic inflammations, like those just mentioned, have been found united

There are morbid conditions of the genito-urinary organs that depend

from the perturbations of the central circulation; if this is relieved or cured with mineral waters, the venous ecstases in the organs contained in the pelvis will disappear, and its consecutive cure will follow.

Well, then, if in these various cases sterility has been caused by chronic inflammation of the endometrium, by that which accompanies inflammation of the fallopian tubes or the immobility of the matrix dependent from adherencies and those conditions are cured by Peñon waters, the reputation they have acquired for the cure of sterility is thereby explained. No need to add that they will be utterly inefficacious for the correction of cervical *atresia* nor for the obliteration of the fallopian tubes, much less the absence of the ovarium.

How can the Peñon waters cure those chronic inflammations of the pelvic organs? They are cured by their temperature, as I have shown in the beginning of this work; they cure them by impressing upon the texture a new activity in their functions of nutrition. I am pleased to lean towards this opinion of Schröder: "Chronic inflammatory diseases of the uterus," says this author, "are cured by determining a curative congestion, the gradual removal of which should be procured afterwards. . . . When I wish to employ local irritation I prefer squirts of warm water at 38°-40° Reaumur; through them I have succeeded in increasing blood circulation and obtaining a more rapid reabsorption."

I advise afflicted women to do vaginal irrigation with the water while at the baths, at the temperature it has in the basin. When general baths are especially forbidden I recommend sitting baths, and the vaginal squirts, better known to ladies by the name of injections. I resort to the same means for combating vaginal catarrhs.

I must add that there are diseases of the pelvic organs which are entirely rheumatismal and for which the Peñon waters must be employed. Uterus rheumatisms, which all physicians have been called upon to treat, belong to this group; in it are embraced the various arthritic diseases, so frequently spoken of in the course of this study, and which are manifested by textural and functional perturbations in the genito-urinary organs.

The relations between the *fibromiomas* and the diseases of the heart has been shown, and Dr. San Juan expresses himself thus: "The production of the fibromiomas of the uterus is a fact subordinate to the manifestation of arthritis, embracing in this, according to Martineau and Pidoux, rheumatism and gout. . . . Based on the foregoing ethiological considerations, I have begun to employ in the general treatment of the fibromiomas a therapeutics subordinate to the indications of arthritics. Among the many means recommended for combating this diathesis, I think that the special thermal waters (he refers to those of Peñon) are in this case the most efficacious."

Chronic Catarrh of the Bladder.

I can cite cases in persons of both sexes, in which the relief of this disease under the influence of the Peñon waters has been brought about.

Besides, I preserve set down in my notebook an evident case of rheumatism of the bladder, for which I recommended the use of the same waters.

Diseases of the Heart and of the Spleen.

It is a fact accepted by science that rheumatism is the cause of many pericarditis, endocarditis and endoarteritis. The consequence of chronic endocarditis is the alteration of the valves which close the apertures of the heart and which in the course of time produce the textural alterations of that organ, known by the name of organic diseases of the heart.

Before becoming definite these injuries pass through an inflammatory period which is susceptible of cure. Based upon this fact I have established since many years ago the treatment of many chronic endocarditis and aorthisis by the use of mercury, of iodide of sodium and of repeated blisterings, and I now begin to apply the use of the Peñon baths and waters in incipient cases and when the alterations have not reached the degree in which the *restitutio ad integrum* becomes impossible.

Arthritis and Diseases of the Bones.

To our colleague, Dr. Semeleder, I owe the knowledge of non-rheumatic arthritis, articular deformities, badly consolidated fractures and diseases of the bones in which the Peñon waters and baths "have produced good and remarkable results," (these are his words), and I have deemed it proper to consign these facts which may serve for new therapeutical application.

It is impossible to consign in so brief a study all the facts observed in personal practice and that of the illustrious colleagues who can have contributed towards widening the scope of thermal water application; but those set down herein, and the considerations of the scientific order in which we entered at the beginning, may serve for a basis for the undertaking of the study of hydrology, with better elements than those within our reach, and the time is not far distant when the Peñon baths will be as well resorted to by patients as are now those of Vichy and Carlsbad.

Mexico, February 24, 1897.

EDUARDO LICEAGA, M. D.



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